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# Tübitak supported science summer school for primary school students: happinence of learning by exploring and enjoying

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**Abstract**

This study is related to results gained from "Primary School Students' Science Summer" project which was supported by TÜBİTAK as part of Science and Society projects. Primary purpose of this study is to generalize such projects and sharing with scientists for shedding a light on further studies by determining how science and art activities were being evaluated from students' point of view. The second purpose of the research is to state if getting involved in such projects generates a positive change on attitudes of students towards science. It was found that students' views were generally positive about the activities done during five days of summer science school.


*Keywords:* Science summer school, attitude towards science, primary pupils, science and society;

## 1. Introduction

Natural exploration sense plays an important role in developing scientific awareness in children and this sense is an important source that they can use in their during their educational lives. Rapidly developing and rising characteristic of knowledge, requiring science teaching methods to be renewed permanently. In economically developed countries, a variety of projects in this point provides cooperation between scientists and educationalists. With this cooperation, children are provided to meet science activities like exploring and testing the hypothesis, their scientific visions are developed at the same time (Haktanır & Güler, 2000). Science education is now primarily interested topic by world's science academies today. Especially after 2000's, science academies had tried to add science education to their education programmes as a voluntary activity for raising preschool and school children's science interest in many world countries. Informal environments as summer camps create learning environments that can complete the knowledge and abilities learned at school enable researching and doing experiments. Individuals will realize that they have to be interrogative and think versatile for reaching the knowledge systemically (Noel-Storr, 2004). While giving science education especially to younger children, they should be guided, be provided exploring and having fun throughout learning, their concerns and fears should be minimized. Thereby

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children can enjoy science (Cho, 2003; Wilson, Cordry & Unline, 2004). Metin and Kılıç (2009); accomplished their TÜBİTAK supported science summer project which named as "Science, Nature and Children, Three of Them Together Science Summer School" in 2008 and in the researches they did during this project, they indicated that science camps helped students to understand the nature of science and how scientific knowledge change. Özdemir (2010) highlighted that, number of alternatives as "science camps", "science centres" and "science museums" where students can observe, test and discuss scientific phenomenon and processes, should be increased and students should be provided to attend these. While science summer camps provide learning environment to be motivating students and more attractive, they form an informal learning environment for students. Camp programs are generally short but intensive. When total time is taken into account, one week camp program is almost equivalent to informing one-two months at schools. Such science camps are very good alternatives for environmental learning (Kılıç & Yardımcı, 2009).

### *1.1. Purpose and importance*

In our country, science and society projects supported by TÜBİTAK, aims to transfer knowledge clearly to the society, in doing so enriching the knowledge with interactive applications by visualizing it as far as possible. In these projects, it is not important to transfer participants as much knowledge as possible by using classic educational methods, but it is to trigger participants' sense of wonder, request of investigation and learning by providing them to recognize simple scientific phenomena. This research includes primary school students who were thought to be affected from the science summer school processes mentioned before. Activities in summer science school included activities which can remove fears and concerns of students that they obtained in science lessons, introduce funny side of science and prepared with different methods and techniques for primary school students and sports and art activities compatible with them. It was aimed to expose and develop students' interests and abilities with the activities carried out during science summer school. With this purpose, it was tried to determine students' views about the activities in summer science school and the effect of activities on students' attitudes towards science in this research and two questions are tried to be answered.

**Problem 1:** What are the evaluations of students about activities carried out at Science Summer School?

**Problem 2:** What is the effect of Science Summer School activities on students' attitudes towards science?

## 2. Methodology

In this research, utilization from activities carried out and interactions of students who attended TÜBİTAK supported Science Summer School, were evaluated. Before Science Summer School actualized with TÜBİTAK support, it was carried out with support of Kocaeli University Research Fund for determining difficulties that could be encountered in 2008. Pilot study had seen intense interest. This situation formed an important step for doing the project again, with increasing its common effect. In this direction, project carried out with TÜBİTAK support firstly in 2009 and it had seen great interest again in the city. The project which mentioned in this study, is a project secondly supported by TÜBİTAK. Including a project coordinator, 4 experts, 13 educator and 24 guides, 42 people worked for the project. In Science Summer School, there are activities which are prepared with different methods and techniques for providing students to utilize as much as they can and sports and art activities compatible with them. Primary school students in Kocaeli consist of this study's universe. Sample of the study is 50 students who were selected randomly from 5$^{th}$ grade students that wanted to attend science school voluntary. 50 students were divided into two groups included 25 student and each group attended 5 day long Science Summer School. Same program carried out with both of the groups.

Data of the study consists of flower room comments that students wrote their views about the activities at the end of the day and their pre and post test attitudes towards science. Students' comments which they wrote about the activities at the end of each day for determining their views about the activities gathered as Today's Comment in Flower Room. Flowers were prepared for each student, with 5 leafs and a photo of the student in a room and students were wanted to write their views about the activities they did that day at the end of each day and hang it up

on a leaf of their flower. At the end of Science Summer School, leafs of each students' flowers were completed. Data was analyzed with content analysis method by using NVivo qualitative data analysis program.

"What I Really Think of Science?" scale with 21 items, which developed by Pell and Jarvis (2001), was used for determining student attitudes towards science, as pre test before the activities of Science Summer School started and as a post test after the activities. Scale consists of three sub-dimensions as 'science enthusiasm', 'social context of science' and 'science is a difficult object'. Score reliability that gained from the original scale, is .82 (Pell and Jarvis, 2001). Reliability analysis was repeated after scale translated to Turkish and score reliability was found as .86 (Buluş Kırıkkaya, 2008). Because, reliability is not a property of the scale; it is a property of the scores obtained from the test or the scale administered to a particular sample that has gone in for the examination (Bademci, 2004; 2007). So, score reliability fluctuates from sample to sample or from administration to administration (Bademci, 2004; 2007; 2008). Accordingly, reliability of scores computed again with data gathered from this study and Cronbach alpha value was found as .73. Reliability of scores gained with data gathered from this study is different than the score reliability gained from the scale which was adapted to Turkish. The scale applied as pre-post test, before activities were started at first day of Science Summer School and for determining the variation in student attitudes towards science after all of activities were done at last day. Obtained pre and post scores analyzed with paired samples t-test.

## 3. Findings

### *3.1. Findings about flower room data*

Given N on tables; is showing total comment number of students. Totally 50 students attended to Science Summer School. But there are less than 50 comments about some of the activities as seen on tables. Because of student comments were taken in writing, there are some students who didn't write a comment about some activities and there are students who write more than one comment for an activity, also it was checked. Thus, N's (total comment number) encountered to be more or less than 50. "The journey of electric charge" activity which given as activity 1 on Table 3.1, was carried out with only 2nd group as alternative activity. Therefore 25 students attended to this activity.

#### *3.1.1. Findings about first day*

Data related to the student comments about the activities that they done in first day of Science Summer School were given in Table 3.1.

Table 3.1: Data about the Comments of 1st Day

| Name of activities | Like | | | Dislike | | |
|---|---|---|---|---|---|---|
| | N | f | % | N | f | % |
| **Activity 1 (Alternative Activity)**: The Journey of Electric Charge | 23 | 22 | 95,65 | 23 | 1 | 4,35 |
| **Activity 2: Drama:** Protecting Environment | 46 | 36 | 78,26 | 46 | 10 | 21,74 |
| **Activity 3:** Your Wonders About Light: How Does the Light Move? How is a Kaleidoscope Made? | 50 | 49 | 98,00 | 50 | 1 | 2,00 |
| **Activity 4:** Dyeing Several Ropes with Natural and Artificial Dyes | 48 | 35 | 72,92 | 48 | 13 | 27,08 |
| **Activity 5:** Let's do Rhythm Instrument, Let's do Rhythm! | 49 | 44 | 89,79 | 49 | 5 | 10,21 |

As seen on Table 3.1, rate of the students who liked each activity more than the students mentioned that they dislike the activities of the first day. 22 (%95,65) of 23 comments about "The Journey of Electric Charge" activity are as it was liked, but 1 (%4,35) of them is as it was disliked. Students who expressed that they liked the activity, reported reasons like the activity was interesting (f=5), nice (f=4), funny (f=3), they saw the materials used in the activity at the first time (f=4), they found the topic nice (f=2) and reasonable (f=1). Total number of reasons isn't equal with the number of students who mentioned they liked the activity, because some students who liked activity didn't indicate a reason. One student who dislike the activity, found the activity boring.

36 (%78,26) of the comments about "Drama" activity are that it's liked and 10 (%21,74) of them are that it's disliked. Students who liked the activity reported that they liked the activity because it was funny (f=10), enjoyable

(f=6), they liked theatre (f=4), it was nice (f=3), it helped to familiarize with their friends (f=2), it exposed their talent (f=2), they made group work (f=2), they learned new information (f=2), they liked the roles in drama (f=2). Students who dislike the activity, mentioned the reasons as the activity was boring (f=5), found disturbing that there was schoolgirl in the group (f=1) and there was noise when doing the activity (f=1).

49 (%98) of the comments about "How Does the Light Move? How is a Kaleidoscope Made?" activity are as the activity was liked, but 1 (%2) of them is as it was disliked. Students who liked the activity, mentioned that they liked the activity because it was enjoyable (f=15) and different (f=7), they learned different information (f=3), they saw very nice images (f=4), they liked the kaleidoscope (f=3), they had what they did (f=2) and they liked to trim it (f=1). Also, it was found that 1 student who disliked the activity, showed the beads' sticking on the glass as a cause.

35 of the students, who wrote a comment about "Dyeing Several Ropes with Natural and Artificial Dyes" activity, expressed that they liked the activity, but 13 of them didn't like this activity. Students who liked the activity, gave reasons as they learned new information (f=9), enjoyed group work (f=5), liked doing experiments (f=4), was satisfied with the results of activity (f=2), liked being in laboratory (f=1) and felt like a scientist (f=1). Students who dislike the activity, mentioned that the activity was boring (f=3), they waited for getting the results (f=2) and the dyes smelled bad (f=1).

44 (89,79) of the comments about "Let's do Rhythm Instrument, Let's do Rhythm!" activity, are positive and 5 (10,21) of them are negative. Students liked the activity, because they liked doing their instruments (f=9), the activity was enjoyable (f=8), they liked the instruments (f=8), music is interesting (f=4), they liked learning new information (f=2), using waste products was drew attention of them (f=1) and they liked forming an orchestra (f=1). Students who expressed that they dislike the activity, gave reasons as their instrument was broken down (f=3), didn't like music lesson (f=1) and didn't like the sound of instrument (f=1).

Students also wrote how they generally felt during the day, like they wrote comments about each activity. Students emphasized that they felt like informed, diligent, proud, nice, great, excited, good, curious, happy, comfortable, lucky, surprised, strange and stumbled for the 1st day. Most of the students who had positive feelings about the 1st day, said that they felt good (f=17) and excited (f=13). Most of the students who had negative feelings, expressed that they felt bad (f=4). Views of some students who had general comments about all of the day are like these:

"I felt fine. Because, it was an enjoyable day."
"I felt great. Because, it was one of the most wonderful days of my life."
"I felt mistaken. Because, I didn't want to be here, but my idea has changed. Everything was great."
"I felt terrible. Because, I couldn't attend to lessons. Because, it was the first day."

It was found that students wrote positive comments about the activities of the 1st day and they had fun during these activities.

### *3.1.2. Findings about second day*

Data related to the student comments about the activities that they done in second day of Science Summer School were given in Table 3.2.

Table 3.2: Data about the Comments of 2nd Day

| Name of activities | Like | | | Dislike | | |
|---|---|---|---|---|---|---|
| | N | f | % | N | f | % |
| **Activity 1**: Let's Make a Journey to the World of Living Creations | 50 | 47 | 94,00 | 50 | 3 | 6,00 |
| **Activity 2:** Shampoo and Cream Production Factory | 52 | 51 | 98,07 | 52 | 1 | 1,93 |
| **Activity 3:** The Application of Japanese Calligraphy Art on Glass Fusion and Jewellery Workouts | 57 | 54 | 94,74 | 57 | 3 | 5,26 |

47 (%94,00) of 50 comments about "Let's Make a Journey to the World of Living Creations" activity are positive, but 3 (%6,00) of them are negative, as seen on Table 3.2. Students who mentioned that they liked the activity gave reasons as they liked observing the living creations closer (f=16), investigating the nature (f=7), collecting insect (f=6) and observing with microscope (f=4). Also they thought the activity enjoyable (f=4), they were provided to learn mew information (f=2) and the activity was nice (f=1). Students who disliked the activity, expressed that it was hard to catch insects (f=2) and they were scared from spider web (f=1).

51 (%98,07) of the 52 comments about "Shampoo and Cream Production Factory" activity are positive, but 1 (%1,93) of them is negative. Students who liked the activity, gave reasons as they liked doing their own productions (f=11), learning to make producing shampoo (f=10), finding the activity enjoyable (f=5) and nice (f=3), doing the activity for the first time (f=4), productions can be usable (f=4), they learned it newly (f=3), they named the productions (f=1) and they can use it at home (f=1). But one student didn't like the activity because shampoo was lathered a lot.

54 (%94,74) of 57 comments about "The Application of Japanese Calligraphy Art on Glass Fusion and Jewellery Workouts" activity are positive and 3 (%5,26) of them are negative. Student who liked the activity mentioned that they liked painting and writing on glass (f=14), learning the meanings of calligraphies (f=7). Also they expressed that they did an activity like this for the first time (f=6), it was good to create a product (f=3), to do their own piece (f=1) and to learn new things they didn't know. Students who dislike the activity, reported that they couldn't do it well (f=2) and they didn't have fun (f=1).

Students also wrote how they generally felt during the second day. Students mentioned positive feelings about the second day, as they felt successful, informed, like a scientist, enjoyed, energetic, enthusiastic, useful, nice, excited, happy, like a teacher, comfortable, lucky, experienced. Also they stated negative feeling like scared and bad. Most of the students who felt positive feelings about second day, felt happy (f=26), nice (f=17) and excited (f=16). Students who said that they had negative feelings, felt scared (f=2) and bad (f=9) because, they observed insects and being tagged in the game. Views of some students who had general comments about all of the day are like these:

"I felt happy. Because, I did and had learned many things."
"I felt very good. Because, I had learned lots of things and it was funny."
"I felt lucky. Because, this chance may not come once again.
"I felt scared. Because I investigated insects."

It was found that students had positive views about the activities of the 2nd day and they had fun during these activities.

### *3.1.3. Findings about third day*

Data related to the student comments about the activities that they done in third day of Science Summer School were given in Table 3.3.

Table 3.3: Data about the Comments of 3rd Day

| Names of activities | Like | | | Dislike | | |
|---|---|---|---|---|---|---|
| | N | f | % | N | f | % |
| **Activity 1**: How is Our City's Most Famous Dessert Pişmaniye Made? Let's Go to Factory of It | 43 | 42 | 97,67 | 43 | 1 | 2,33 |
| **Activity 2:** Let's Determine the Amplitude and the Richter Magnitude of an Earthquake | 48 | 29 | 60,41 | 48 | 19 | 39,59 |
| **Activity 3:** The Documentary of Black Holes | 39 | 33 | 84,61 | 39 | 6 | 15,39 |
| **Activity 4:** We are Learning Ice-skating! | 48 | 47 | 97,91 | 48 | 1 | 2,09 |

As seen on Table 3.3, number of students who liked activities of 3rd day more than the students who expressed that they dislike activities.

42 (%97,67) of 43 comments about "How is Our City's Most Famous Dessert Pişmaniye Made? Let's Go to Factory of It" activity are positive, but 1 (%2,33) of them is negative. Students who liked the activity, liked it because they learned how it was done (f=16) and they ate pişmaniye (f=15). Also some students mentioned that they liked the activity because they saw how it was made for the first time (f=4), they learned new information (f=3), they liked the stories which told (f=2). One student, who disliked the activity, expressed that it wasn't good.

29 (%60,41) of comments about "Let's Determine the Amplitude and the Richter Magnitude of an Earthquake" activity are positive, but 19 (%39,59) of them are negative. Students who mentioned that they liked the activity, gave reasons as they learned new information (f=6), they were curious about this topic (f=2), it was enjoyable (f=2), it was told nice (f=1) and they did some mathematical operations (f=1). Students who dislike the activity, didn't like it because they thought it was boring (f=13), they couldn't understand (f=1) and it was long (f=1).

33 (%84,61) of the comments about "The Documentary of Black Holes" activity are positive, but 6 (%15,39) of them are negative. Students who liked the activity, liked it because they learned new information, they liked station activity (f=7) and the documentary was good (f=3). Students who dislike the activity, disliked it because they found it boring (f=3), scary (f=3) and they didn't like singing (f=1).

47 (%97,91) of comments about "We are Learning Ice-skating!" activity are positive, but 1 (%2,09) of them is negative. Students who expressed that they liked the activity, gave reasons as it was enjoyable (f=19), it provided them to learn ice-skating (f=10), they like ice-skating (f=6) and they did it for the first time (f=2). One student didn't like the activity, because of falling down.

Students also wrote how they generally felt during the day, like they wrote comments about each activity. Students emphasized that they felt happy, excited, good, informed, amused, successful, like scientist, bored, tired and unhappy about the 3rd day. Most of the students who had positive feelings about the first day, felt happy (f=23) and excited (f=10). Most of the students who had negative feelings, emphasized that, they felt unhappy (f=6).

Views of some students who had general comments about all of the day are like these:

"I felt successful. Because, we have learned lots of new things."

"I felt enjoyed. Because, I had fun while I was doing all of the activities."

"I felt super. Because, this is the happiest day of my life."

"I felt tired. Because, I got up early in the morning."

"I felt bad. Because, I fell down while ice-skating."

It was determined that students mostly had positive views about the activities of the 3rd day and they had fun while doing these activities.

*3.1.4. Findings about fourth day*

Data related to the student comments about the activities that they done in fourth day of Science Summer School were given in Table 3.4.

Table 3.4: Data about the Comments of 4th Day

| Names of activities | Like | | | Dislike | | |
|---|---|---|---|---|---|---|
| | N | f | % | N | f | % |
| **Activity 1**: Let's Know Fruits on Branch! Let's Plant a Flower. | 50 | 47 | 94,00 | 50 | 3 | 6,00 |
| **Activity 2:** Aircraft Workshop: We are Making ATA Aircraft. | 50 | 47 | 94,00 | 50 | 3 | 6,00 |

As seen on Table 3.4, rate of students who expressed that they liked the activities of 4th day more than the students who said they dislike.

47 (%94,00) of 50 comments about "Let's Know Fruits on Branch! Let's Plant a Flower" activity are positive, 3 (%6,00) of them are negative. Students gave reasons as they liked planting flower (f=26) and they enjoyed to eat fruits that they berried (f=8). Three students who disliked the activity expressed reasons like they joined the activity late (f=1), they hate snails and smells of fruits (f=1).

47 (%94,00) comments about "Aircraft Workshop: We are Making ATA Aircraft." activity are as the activity was liked and 3 (%6,00) of them are as it disliked. Students who liked the activity mentioned that the activity was enjoyable (f=12), they liked making aircraft (f=7) and they were flied their aircrafts (f=7), but the students who disliked the activity gave reasons as their planes airfoil had broken (f=2) and the activity was boring (f=1).

Students also wrote how they generally felt during the day, like they wrote comments about each activity. About the 4th day students emphasized that they felt informed, diligent, proud, nice, great, excited, good, curious, happy, comfortable, lucky, skilled, environment-friendly, pilot, engineer and bad. Most of the students who expressed that they felt positive feeling about fourth day indicated they were happy (f=28) and fine (f=18). Most of the students who had negative feeling emphasized that they felt unhappy (f=5).

Views of some students who had general comments about all of the day are like these:

"I felt successful. Because, I was informed."

"I felt happy. Because, I had a flower."

"I felt proud. Because, my plane is good."

"I felt sad. Because, we are getting close to last day of Science Summer School tomorrow."

It was determined that students mostly had positive views about the activities of the 4th day and they had fun while doing these activities.

*3.1.5. Findings about fifth day*

Data related to the student comments about the activities that they done in fifth day of Science Summer School were given in Table 3.5.

Table 3.5: Data about the Comments of 5th Day

| Names of activities | Like | | | Dislike | | |
|---|---|---|---|---|---|---|
| | N | f | % | N | f | % |
| **Activity 1**: Let's Benefit From the Sun: The Construction of Solar Battery! | 47 | 35 | 74,46 | 47 | 12 | 25,54 |
| **Activity 2:** Let's Benefit From the Sun: The Construction of Solar Robot! | 50 | 49 | 98,00 | 50 | 1 | 2,00 |
| **Activity 3:** Poster Competition: Our Creativity is Up and Doing! | 50 | 39 | 78,00 | 50 | 11 | 22,00 |

As seen on Table 3.5, rate of students who expressed that they liked the activities of 5th day, more than the students who said they dislike.

35 (%74,46) of the 47 comments about "Let's Benefit From the Sun: The Construction of Solar Battery!" activity are positive, but 12 (%25,54) of them are negative. Students who liked the activity expressed that they liked the activity because they have learned making solar battery (f=8), activity was enjoyable (f=5), nice (f=4) and interesting (f=1), they used such as activity tools for the first time (f=3). Students who disliked the activity, disliked it because they couldn't do solar battery like thy wanted (f=5) and found the activity boring (f=3).

48 (%98,00) of the comments about "Let's Benefit From the Sun: The Construction of Solar Robot!" activity are positive, but 1 (%2,00) of them is negative. Students who liked the activity, gave reasons as they had a robot (f=14), activity was enjoyable (f=5) and easy (f=1), they did it for the first time (f=2), they raced (f=1). Student who disliked the activity, disliked it because the weather wasn't sunny.

39 (%78) of the comments about "Poster Competition: Our Creativity is Up and Doing!" activity are positive, bur 11 (%22) of them are negative. Students who liked the activity mentioned that, they liked the activity because they did good posters (f=6), it improved their creativity (f=4), they did a competition (f=3), it was enjoyable (f=1). Most of the students who disliked the activity reasoned this as the time was short (f=3) and they didn't know who would take the first place (f=2).

Students also wrote how they generally felt during the day, like they wrote comments about each activity. Students emphasized that they felt like informed, proud, nice, great, excited, good, curious, happy, comfortable, lucky, unhappy and bad, for the 5th day. Most of the students who had positive feelings about the 5th day, felt happy (f=25) and good (f=14). Most of the students who had negative feelings, felt unhappy (f=24).

Views of some students who had general comments about all of the day are like these:

"I felt successful. Because, I have learned to make solar robot."

"I felt excited. Because, let's look which place I will get."

"I felt as a racer. Because, we raced robots."

"I felt sad. Because, it was the last day of Science Summer School."

It was determined that students mostly had positive views about the activities of the 5th day and they had fun while doing these activities.

*3.2. Findings about data of pre-post tests student attitudes towards science*

Pre and post scores obtained from the scale which was applied as pre-post tests, analyzed with paired samples t-test and the findings were given on Table 3.6.

Table 3.6: Analysis of Difference between Science Attitudes Pre Test and Post Test Average Points with Paired Samples t-test

| | N | X | SS | Sd | t | p |
|---|---|---|---|---|---|---|
| Pre Test Attitude | 50 | 2.46 | .02 | .20 | .30 | .76 |
| Post Test Attitude | 50 | 2.45 | .02 | .18 | | |

There isn't any significant change between pre test and post test average attitude scores as seen on Table 3.6 ($p>.05$).

## I. Results, discussion and suggestions

1. It is seen that students generally indicated positive views about the activities that they did during the five days of Science Summer School. Science Summer School project was done two times with TUBİTAK support before, three times in the aggregate and findings obtained from the other two projects are parallel to these findings. In accordance with the results of the TÜBİTAK supported project which was done by researchers in 2009, it was determined that students utilized from the activities well and were affected positively, wrote positive comments about they wanted it to be extended and be done again. Also it was determined that most of the students mentioned, the activities improved their self-confidence and they could do science experiments more comfortable (Buluş Kırıkkaya, Bali, Bozkurt, İşeri & Vurkaya, 2010). Even results of some researches are like; science camps prepare entertaining and instructive environments for informal learning of students and students enjoy activities at science camps (Verma, 2007; Metin&Bağcı Kılıç, 2009; Yardımcı&Bağcı Kılıç, 2009; Yürümezoğlu, Şen, Çakmakcı&Oğuz Ünver, 2010). TÜBİTAK supported projects like this contribute students to develop positive attitude towards science and in this research students positive comments support this result (Yürümezoğlu, et al. 2010). Also different researches put forward that different activities except formal sources, make learning more efficient. It was seen that diversifying the activities which children engaged in, has deep effects on developing skills that they gained at school (Gerber, Cavallo&Marek, 2001; Hannu, 1993). This result gained from the research, shows that students like the activities such as sports and art activities which they taste learning with exploring, beside the scientific activities. This result suggests that it is necessary to raise the number of such projects and expand its common effect.

2. There isn't any meaningful difference between students' pre test post test average scores of attitude towards science. Pre test average score of attitude is determined as X=2,46 for a three point likert scale. In this case, it can be said that, students had positive attitudes towards science before Science Summer School. In this context, criterion of volunteering in the application can be interpreted as students who had positive attitude towards science, were volunteer. It can be one of the reasons of not obtaining changes on attitude that students had highly positive attitudes on pre tests. Because of similar causes, any meaningful difference couldn't be found in some of researches which investigated effects of different methods science attitudes (Alkan, 2006; Ünal & Ergin, 2006; Işık, 2007; Taşkoyan, 2008). Applications are short-termed in Summer Science School. Also it can be the reason of not occurred any changes on students' attitude scores. Thus, Özsevgeç (2006) emphasized that long-term applications had to be done for gaining changes on attitudes of students. Also, idea about changes on attitudes can be based on the time of application, is supported by the findings about comments of the day provided students to develop positive views on activities and the activities provided them to develop positive views on science. According to this result of the study, it can be suggested that applications time can be longer at science and society projects.

## References


Alkan, A. (2006). Primary Students' Attitudes towards Science Lesson. *Master Thesis*, Afyon Kocatepe Univesity, Social Science Institute, Afyonkarahisar.

Bademci, V. (2004). It is incorrect to speak of "the reliability of the test" or " the test is reliable". *Journal of Turkish Education Science*,3 (2), 367-373.

Bademci, V. (2007). Changing of Paradigm in Measurement and research methods: Tests Not Reliable. Ankara: Yen yap Publication.

Bademci, V. (2008). In The Researches, To Correct Some Of The Enormous Errors Related Wıth Measurement And To Maintain Restructuring in The Education: Reliability Is Not A Characteristic Of Tests. *The Journal of the Industrial Arts Education Faculty of Gazi University,* 22, 50-69.

Buluş Kırıkkaya E. (2008). 4th and 5th Primary Students' Attitudes Towards Science, *Classroom Teaching Congress*, Çanakkale, Turkey.

Buluş Kırıkkaya,E., Bali, G., Bozkurt, E., İşeri, Ş. & Vurkaya, G. (2010). *Entertaining Science Summer School Activities For Primary Pupils*, *XIV. IOSTE Symposium* Bled, Slovenia.

Cho, H., Kim, J. & Choi, D. H., 2003, Early Childhood Teachers' Attitudes Towards Science Teaching: A Scale Validation Study. *Educational Research Quarterly*. 27 (2), 33-42.

Gerber, B.L., Cavallo, A.M.L. & Marek, E.A. (2001). Relationships among informal learning environments, teaching procedures and scientific reasoning ability. *International Journal of Science Education*, 23 (5), 535- 549.

Haktanır, G. & Güler, T. (2000). Preschool Children's Ideas About Animals, *IV. Science Congress,* Hacettepe Universitiy Ankara: Turkey

Hannu, S. (1993). Science Centre Education. Motivation and Learning 4n Informal Education. *Unpublished Doctoral Dissertation*, Helsinki University Department of Teacher Education, Helsinki: Finland.

Işık, A.D. (2007). Effects Of Learning Package Of Elementary 5th Grade Science And Technology Lesson Prepared In Accordance With The Constructivist Approach on Attitudes and Achievement To Science and Technology, *Master Thesis*, Dokuz Eylül University, Institute of Educational Sciences, İzmir, Turkey.

Metin,D. & Bağcı Kılıç, G. (2009). The Effect of The Science Camp Program on Children's Views of he Tentative Nature of Science. *Science Education Research Association 2009 Conference,* Istanbul, Turkey.

Noel-Storr,J. (2004). The role of immersive informal science programs. Retrieved 01.12. 2010, from; http://arxiv.org/ftp/physics/papers/0403/0403144.pdf adresinden alınmıştır.

Özdemir, O. (2010). Status in Science Literacy of Science and Technology Teachers, *Journal of Turkish Science Education*, 7 (3), ISSN 1304-6020.

Özsevgeç, T. (2006). Determining Effectiveness of Student Guiding Material Based On the 5E Model in "Force and Motion" Unit, *Journal of Turkish Science Education,* 2(2), 36-48, ISSN 1304-6020.

Pell, T. & Jarvis, T. (2001). Developing attitude to science scales for use with children of ages from five to eleven years. *International Journal of Science Education*, 23 (8), 847–862, ISSN 1304-6020.

Taşkoyan, S.N.(2008). Effects of The Learning Strategies of Questioning on Questioning Learning Skills , Academic Achievements and Attitudes of Students in Teaching of Science and Technology*, Master Thesis*, Dokuz Eylül University, Institute of Educational Sciences, İzmir, Turkey.

Ünal, G. & Ergin, Ö. (2006). Effects on Students' Academic Achievements, Learning Approaches and Attitudes of Science Teaching With Discovery, *Journal of Turkish Science Education*, 3(1), 36-52 ISSN 1304-6020.

Verma, H. C. (2007). Children's Science Training Camp. Retrieved 01.12. 2010, from; http://www.iitk.ac.in/infocell/iitk/cstprogramme.pdf.

*Wilson, J. D, Cordry, S. & Unline, C. (2004), Science Fairs: Promoting Positive Attitudes Towards Science From Students Participation.* Student Journal*. 38 (1).*

Yardımcı, E. & Kılıç,G. (2009). Efect of Nature-Based Educatin on a Camp on Children's Attitudes Towar Environment and Their Ideas about Human-Nature Interaction, *Science Education Research Association (ESERA) 2009 Conference*, Istanbul, Turkey.

Yürümezoğlu, K., Şen A.İ., Çakmakcı, G. & Oğuz Ünver, A. (2010). Akyaka Nature Science Camp: A Study to change Perceptions of the Students with Related to Scientist, IX. National Congress Education of Science and Mathematics, 2010 İzmir, Turkey